Abstract Submitted
for the DPP15 Meeting of
The American Physical Society

The PLX-α project: demonstrating the viability of spherically imploding plasma liners as an MIF driver[1] S.C. HSU, LANL, F.D. WITHERSPOON, HyperV Technologies, J.T. CASSIBRY, UAHuntsville, M. GILMORE, UNM, R. SAMULYAK, BNL, P. STOLTZ, Tech-X, AND THE PLX-α TEAM — Under ARPA-E's ALPHA program, the Plasma Liner Experiment-ALPHA (PLX-α) project aims to demonstrate the viability and scalability of spherically imploding plasma liners as a standoff, high-implosion-velocity magneto-inertial-fusion (MIF) driver [1] that is potentially compatible with both low- and high-β targets. The project has three major objectives: (a) advancing existing contoured-gap coaxial-gun technology to achieve higher operational reliability/precision and better control/reproducibility of plasma-jet properties and profiles; (2) conducting $\sim \pi/2$-solid-angle plasma-liner experiments with 9 guns to demonstrate (along with extrapolations from modeling) that the jet-merging process leads to Mach-number degradation and liner uniformity that are acceptable for MIF; and (3) conducting 4π experiments with up to 60 guns to demonstrate the formation of an imploding spherical plasma liner for the first time, and to provide empirical ram-pressure and uniformity scaling data for benchmarking our codes and informing us whether the scalings justify further development beyond ALPHA. This talk will provide an overview of the PLX-α project as well as key research results to date.

[1] S. C. Hsu et al., IEEE Trans. Plasma Sci. **40**, 1287 (2012).

[1]Supported by ARPA-E's ALPHA program; original PLX construction supported by DOE Fusion Energy Sciences.

Scott Hsu
Los Alamos National Laboratory

Date submitted: 21 Jul 2015 Electronic form version 1.4